

WHAT IS CLAIMED IS:

1. A control apparatus for numerical control in a cutting machine having a turret to be rotated to arbitrary positions, said control apparatus comprising:

means for inputting cutting edge data (m, n) indicating a position of a cutting edge of a cutting tool;

means for inputting turret angle data (α) indicating an extent of rotation of said turret;

means for reading reference offset values (X_0 , Z_0) corresponding to a length from said cutting edge to a turret axis (B);

means for obtaining offset data ($X\alpha$, $Z\alpha$) from said reference offset values (X_0 , Z_0) and said turret angle data (α);

means for adding said cutting edge data (m, n) to said offset data ($X\alpha$, $Z\alpha$) to obtain turret axis data (ΔX , ΔZ); and

means for moving said turret on the basis of said turret axis data (ΔX , ΔZ) to perform a cutting.

2. A control apparatus according to claim 1, wherein a set of said offset data ($X\alpha_i$, $Z\alpha_i$) corresponding to a position of said cutting edge is calculated from said reference offset values (X_0 , Z_0) and the corresponding turret angle data (α_i) on the basis of the following equations 1 and 2.

$$X\alpha_i = Z_0 \cdot \cos \alpha_i - X_0 \cdot \sin \alpha_i \quad (\text{equation 1})$$

$$Z\alpha i = Z0 \cdot \sin \alpha i + X0 \cdot \cos \alpha i \quad (\text{equation } 2)$$

3. A control apparatus according to claim 2, wherein a set of said turret axis data (ΔX_i , ΔZ_i) corresponding to a position of said cutting edge is calculated from the corresponding offset data ($X_{\alpha i}$, $Z_{\alpha i}$) and the corresponding cutting edge data (m_i , n_i) on the basis of the following equations 3 and 4.

$$\Delta X_i = m_i + X_{\alpha i} \quad (\text{equation } 3)$$

$$\Delta Z_i = n_i + Z_{\alpha i} \quad (\text{equation } 4)$$

4. A cutting machine including the control apparatus according to any of claims 1 through 3.

5. A cutting method employing a cutting machine having a turret to be rotated to arbitrary positions, comprising the steps of;

inputting cutting edge data (m , n) and turret angle data α ;

reading reference offset values ($X0$, $Z0$);

calculating offset data (X_{α} , Z_{α}) from said turret angle data (α) and said reference offset values ($X0$, $Z0$);

calculating turret axis data (ΔX , ΔZ) from said offset data (X_{α} , Z_{α}) and said cutting edge data (m , n); and

performing a cutting on the basis of said turret axis

data (ΔX , ΔZ).

6. A cutting method according to claim 5, wherein a set of said offset data (X_{ai} , Z_{ai}) corresponding to a position of said cutting edge is calculated from said reference offset values (X_0 , Z_0) and the corresponding turret angle data (α_i) on the basis of the following equations 1 and 2.

$$X_{ai} = Z_0 \cdot \cos \alpha_i - X_0 \cdot \sin \alpha_i \quad (\text{equation 1})$$

$$Z_{ai} = Z_0 \cdot \sin \alpha_i + X_0 \cdot \cos \alpha_i \quad (\text{equation 2})$$

7. A cutting method according to claim 6, wherein a set of said turret axis data (ΔX_i , ΔZ_i) corresponding to a position of said cutting edge is calculated from the corresponding offset data (X_{ai} , Z_{ai}) and the corresponding cutting edge data (m_i , n_i) on the basis of the following equations 3 and 4.

$$\Delta X_i = m_i + X_{ai} \quad (\text{equation 3})$$

$$\Delta Z_i = n_i + Z_{ai} \quad (\text{equation 4})$$